

**ABSTRACT**

According to one aspect of the present invention, there is provided a signal transmission apparatus for a mobile communication system. In the signal transmission apparatus, a frame segmentation section segments an input frame into  $B_k$  bit group, where  $k = 1, \dots, K$ . A first group of encoders encodes  $B_k$  bit group and outputs encoded symbols. A second group of encoders encodes other  $B_k$  bit group and output other encoded symbols. Each encoded symbol is encoded again to the transmit antennas using different functions. A transmission section includes a plurality of antennas in groups of a predetermined number of antennas, and the total number  $N$  of antennas is larger than the sum of the number of antenna groups. The transmission antennas transmit symbols encoded by one of the encoders.